

What is claimed is:

Claims:

1. A pneumatic tire comprising:
  - a carcass;
  - a tread disposed radially outward of said carcass;
  - a sidewall intersecting said tread at a shoulder; and
  - 5 a belt reinforcing structure positioned radially between said carcass and said tread, the belt reinforcing structure including a plurality of cut belts, a plurality of spiral wound belt layers positioned radially between said plurality of cut belts and said tread, and a plurality of spiral wound shoulder layers overlapping at least said plurality of cut belts proximate said shoulder, said plurality of spiral wound belt layers and said
  - 10 plurality of spiral wound shoulder layers formed by a continuous cord-reinforced strip having a strip width, said plurality of spiral wound belt layers characterized by a first winding pitch of greater than or equal to one strip width per revolution and said plurality of spiral wound shoulder layers characterized by a second winding pitch of less than one strip width per revolution.
2. The pneumatic tire of claim 1 wherein at least one of said plurality of spiral wound belt layers partially overlaps at least one of said plurality of spiral wound shoulder layers.
3. The pneumatic tire of claim 1 wherein said plurality of spiral wound shoulder layers includes four spiral wound shoulder layers.

4. The pneumatic tire of claim 3 wherein the second winding pitch is about 0.2 of a strip width per revolution.
5. The pneumatic tire of claim 1 wherein the second winding pitch is about 0.2 of a strip width per revolution.
6. The pneumatic tire of claim 1 wherein said belt reinforcing structure includes six cut belt layers, two spiral wound belt layers and six spiral wound shoulder layers.
7. The pneumatic tire of claim 6 wherein at least two of said spiral wound shoulder layers are applied with a second winding pitch of about zero.
8. The pneumatic tire of claim 1 wherein said plurality of spiral wound belt layers and said plurality of spiral wound shoulder layers are wound with a zero degree spiral.

9. A pneumatic tire comprising:
- a carcass having an equatorial plane;
  - a tread disposed radially outward of said carcass;
  - a sidewall intersecting said tread at a shoulder; and
- 5 a belt reinforcing structure positioned radially between said carcass and said tread, the belt reinforcing structure including a plurality of cut belts and a plurality of spiral wound belt layers positioned radially between said plurality of cut belts and said tread, said spiral wound belt layers overlapping said plurality of cut belts proximate said shoulder, said plurality of spiral wound belt layers formed by a continuous cord-
- 10 reinforced strip having a strip width, adjacent pairs of said plurality of spiral wound belt layers displaced laterally relative to said equatorial plane by a shift distance of less than one strip width for defining a plurality of spiral wound shoulder layers proximate said shoulder.
10. The pneumatic tire of claim 9 wherein at least one of said spiral wound belt layers includes a plurality of overlapping turns of said strip located proximate to said shoulder.
11. The pneumatic tire of claim 9 wherein said belt reinforcing structure includes two cut belts and six spiral wound belt layers, and wherein said shift distance is about 0.33 of the strip width.
12. The pneumatic tire of claim 9 wherein said plurality of spiral wound belt layers are wound with a zero degree spiral.

13. A method of reinforcing the shoulder of a pneumatic tire, comprising:  
applying a plurality of cut belt layers to a carcass;  
winding a cord-reinforced strip circumferentially about the plurality of cut belt layers with a first winding pitch greater than or equal to one strip width to form a spiral wound belt layer; and  
5 winding the cord-reinforced strip with a second winding pitch less than one strip width proximate each shoulder of the tire for applying a plurality of spiral wound shoulder belts at each shoulder having a partially overlapping relationship with lateral free edges of said cut belt layers.
14. The method of claim 13 wherein the second winding pitch is about 0.2 of a strip width per revolution.
15. The method of claim 13 further comprising:  
winding the cord-reinforced strip circumferentially about the spiral wound belt layer at the first winding pitch to form another spiral wound belt layer.
16. The method of claim 13 wherein said spiral wound belt layers and said plurality of spiral wound shoulder layers are wound with a zero degree spiral.

17. A method of reinforcing the shoulder of a pneumatic tire, comprising:
- applying a plurality of cut belt layers to a carcass;
- winding a cord-reinforced strip characterized by a strip width circumferentially about the plurality of cut belt layers with a winding pitch to form a first spiral wound
- 5 belt layer;
- defining a starting location for a first turn of a second spiral wound belt layer by shifting the strip laterally by less than one strip width; and
- winding the cord-reinforced strip circumferentially about the first spiral wound belt layer with the winding pitch to form a second spiral wound belt layer.
18. The method of claim 17 wherein the first and said second spiral wound belt layers are wound with a zero degree spiral.
19. The method of claim 17 wherein the starting location is defined by a shift distance of about 0.33 of the strip width.